

**METHOD OF OPERATION**  
**TRUNK CIRCUIT**

Outgoing To Recording Operator - Arranged To Be Called By Mechanical Subscribers Or Special "A" Operator - Arranged To Compensate For Ground Potential and Difference In Office Battery Voltage - Special "A" Switchboard - Power Driven Machine Switching System.

GENERAL DESCRIPTION

1. This circuit is used in completing calls from a mechanical sub-station or from a semi-mechanical "A" Board to a recording operator at the long-distance office. At its outgoing trunk end it is used with "A" Board cord circuits whose sleeves are connected to battery through a maximum resistance of 127 ohms. On calls incoming from mechanical stations the district selector selects and connects to the T, R, and S leads. The circuit is so arranged that the recording operator may signal the special "A" operator and the recording operator may be recalled by the special A operator, or on a full mechanical call, by the calling party. It is also arranged to make the sleeve terminal busy, and hold the circuit, awaiting disconnection from both mechanical subscriber and the recording operator.

DETAILED DESCRIPTION

2. When subscriber's district selector seizes the tip, ring and sleeve terminals of this trunk, the TB relay operates when the district has reached the position of selection beyond. The relay operates in a circuit from ground through the 3-4 terminals of the repeating coil, break contact of the R relay, and the R lead to the district and sender circuits, back over the T lead, break contact of the R relay, 7-8 terminals of the repeating coil, winding of the S relay to battery. The TB relay operated, locks in a circuit from battery through its outer winding, break contacts of the R and TF-1 relays to ground on the S lead and closes a circuit from this same ground to battery through the winding of the TF relay, operating it. The TF relay operated (a) disconnects the winding of the SL relay from the sleeve of the outgoing trunk jack, (b) connects battery to the sleeve of the O G.T. jack as a busy condition, (c) opens the operating circuit from the TF-1 and (d) closes in part, a circuit to operate the R relay.

3. When the district circuit advances to trunk closure, awaiting the operator's answer, the S relay operates in series with the GS relay in the district and closes a circuit operating the SL relay from battery on the break contact of the TF-1 relay. The SL relay operated, connects ground to the sleeve of the district, making it test busy, and closes a circuit operating the SW relay. The SW relay operated, (a) connects the T and R leads through to the trunk circuit, thus closing a circuit operating the SL relay in series with a relay in the trunk circuit, (b) connects ground to terminal 3 of the repeating coil, thus short circuiting the inner winding of the TB relay and (c) operates the TBA relay. When the relay in the trunk circuit operates, the trunk lamp lights and a ringing tone is transmitted back to the calling subscriber. The operation of the TBA relay operates the TB-1 relay, which connects ground to the sleeve terminal, and closes in part the operating circuit for the R relay, but the relay does not operate at this time, as the S-1 relay is operated.





4. When the call is answered by inserting the plug of the answering cord in the jack associated with the lighted line lamp the lamp is extinguished the ringing tone is disconnected from the trunk, and the battery and ground are disconnected from the T and R leads releasing the S-1 relay. The S-1 relay released, operates the R relay. The R relay operated, (a) locks to ground on its make contact under control of the TB-1 relay, (b) opens the locking circuit of the TB relay which releases and (c) reverses battery and ground over the T and R leads to the district selector, causing the polarized relay to operate and advance the district to its talking position.

5. The mechanical subscriber may flash the recording operator, by momentarily depressing the switchhook thus causing the S relay to release and operate. The release of the S relay opens the circuit releasing the SL relay which in turn releases the SW relay. The SW relay released, connects battery and ground through the T and TD relays to the tip and ring of the trunk, operating the bridged relay and lighting the supervisory lamp in the recording operators cord circuit. The T relay will also operate through the bridged relay, and hold the TB-1 and TBA relays operated during the flashing period. The TBA relay is made slow in releasing to insure the TB-1 relay, remaining operated during the period between the release of the SW and the operation of the T relays when the holding circuit for the TBA relay is open.

6. If the recording operator disconnects before the subscriber has replaced the receiver on the switchhook, the S-1 relay will operate, but will perform no useful function at this time.

7. When the receiver at the calling station is replaced on the switchhook, the S relay releases opening the circuit releasing the SL relay, which in turn will release the SW relay. The SW relay released, connects battery and ground through the T and TD relays, over the tip and ring, operating the T relay, through a shunt in the operator's cord circuit. The TD relays will not operate under these conditions, as the windings are differentially connected. The operation of the T relay holds the TBA and TB-1 relays operated, thus keeping the S lead grounded, holding the district in the talking position until disconnection takes place at the recording position. When the plug of the recording cord is withdrawn from the trunk jack, battery and ground are again connected to the tip and ring of the trunk at the distant end. Under these conditions the T relay will release or the TB relay will operate. In either case, the TBA and TB-1 relay will release. The release of the TB-1 relay opens the holding circuit of the TF and R relays, restoring the circuit to normal. The TB-1 relay releases, and also disconnects ground from the sleeve terminal, restoring the district circuit to normal.

8. NOTE: The conditions determining whether the T relay will release, or whether the TD relay will operate, depend upon (a) the polarity of the central office battery at the recording end, (b) the presence of ground potential between the two offices, (c) the direction of the ground potential current, and (d) the difference in the voltages of the central office batteries. The T and TD relays will function properly in the circuit with a difference of 7 volts or less between the central office batteries, irrespective of any ground potential in either direction.





9. When this circuit is selected by a special A operator, and the plug of a cord is inserted in the outgoing trunk jack, the SL relay operates from battery on the sleeve of the cord. The operation of the SL relay connects ground to the sleeve of the district circuit, making it test busy to all mechanical selectors. It also operates the SW relay, which operates the S-1, TBA, TB-1 relays. These relays operate and function as described in paragraph #3. When the distant operator answers, the S-1 relay releases and closes a circuit operating the (TF-1) relay from battery winding of the TF-1 relay, break contact of the TF relay, make contact of the TB-1 relay to ground on the break contact of the S-1 relay. The operation of the TF-1 relay connects battery and ground to the "A" Board cord circuit, extinguishing the supervisory lamp.

10. The "A" operator may flash the recording operator, by removing the plug of the cord and immediately re-inserting it in the trunk jack. This releases and operates the SL relay, which functions as described in paragraph #5.

11. When the recording operator disconnects before the "A" operator, the circuit functions as described in paragraph #6. When the A operator disconnects before the recording operator, the circuit functions the same as described in paragraph 7.



CIRCUIT REQUIREMENTS

	<u>OPERATE</u>	<u>NON OPERATE</u>	<u>RELEASE</u>
B169 (T)	Special requirements to insure Fast operation. Readj. .0059 amp. Test .0062 amp. W.C.C. .0091 amp.		Readj. .0029 amp. Test .0027 amp. W.C.C. .0027 amp.
B175 (S-1)	Readj. .0026 amp. Test .0036 amp. W.C.C. .0045 amp.	Readj. .0014 amp. Test .0013 amp.	
B175 (TD)	Readj. .0026 amp. Test .0028 amp. W.C.C. .0028 amp.	Readj. .0014 amp. Test .0013 amp.	
B207 (S)	After a soak of approximately .3 amp Readj. .015 amp. Test .021 amp. W.C.C. .026 amp.		After a soak of approximately .3 amp. Readj. .004 amp. Test .0038 amp. W.C.C. .0025 amp.
B273 (TB) Inner Wdg. 50 ohms	Special requirements to insure fast operation. Readj. .0083 amp. Test .0088 amp. W.C.C. .0128 amp.		Readj. .003 amp. Test .0028 amp.
Outer Wdg. 1000 ohms.	Test .0067 amp. W.C.C. .0114 amp.		
E106 (R)	Readj. .030 amp. Test .035 amp. W.C.C. .040 amp.	Readj. .015 amp. Test .014 amp.	
B484 (SL)	Readj. .014 amp. Test .021 amp. W.C.C. .028 amp.		Readj. .002 amp. Test .001 amp.
E592 (TF) (SW)	Readj. .024 amp. Test .026 amp. W.C.C. .027 amp.	Readj. .013 amp. Test .012 amp.	
E667 (TB-1)	Readj. .027 amp. Test .034 amp. W.C.C. .040 amp.		Readj. .004 amp. Test .002 amp.







CIRCUIT REQUIREMENTS

	<u>OPERATE</u>	<u>NON OPERATE</u>	<u>RELEASE</u>
E1451 (TF-1)	Readj. .021 amp. Test .031 amp. W.C.C. .040 amp.	Readj. .013 amp. Test .012 amp.	
149-P (TBA)	Special requirements for timing feature. Shall operate and hold when the current through the relay winding is interrupt- ed on 1/3 second make and 1/3 second break time intervals. Readj. .018 amp. Test .019 amp. W.C.C. .020 amp.		Shall operate and release (follow the pulses) when current through the relay winding is interrupt- ed on 1/2 second make and 1/2 second break time intervals. Readj. .018 amp. Test .018 amp.

The above circuit interruptions may be obtained by using Relay  
Test Circuit T-438798.

ENG.--JLS:ML.  
10-3-21.

CHK'D.--WCD:CWP.

APPROVED - C. L. SLUYTER, G.M.L.

FM

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